ISE-MeshTools Tutorials

Tutorial 08 : working with scalars

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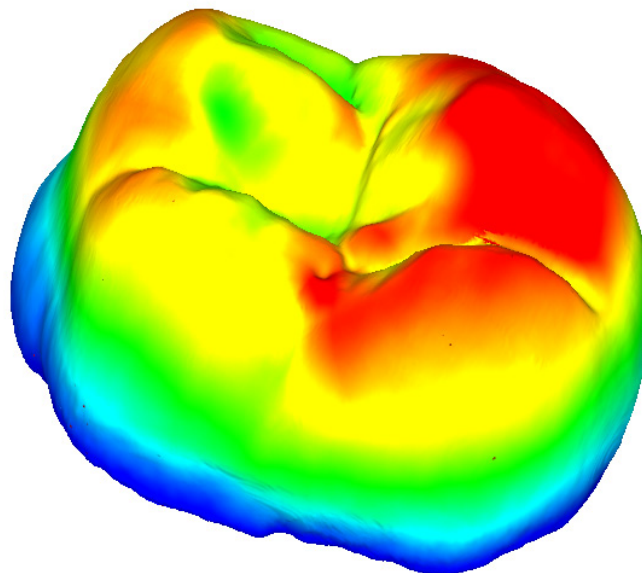
Tutorial 08 includes:

- Two .vtk surface files representing a human upper right second molar
- Two .pos files
- One .ntw file
- One .ori file
- The present .pdf document

Working with scalars

Contents

1. About the specimen

The surface files enclosed in this tutorial represent the three-dimensional reconstruction of the second upper right molar of a medieval *Homo sapiens* (SP07) of Sains-en-Gohelle (France). The 3D data were obtained by Pauline Colombet (PACEA, Bordeaux) at the MRI µCT platform housed at the ISE-M. The outer enamel surface (OES) and enamel-dentine junction (EDJ) were extracted by Mona Le Luyer (PACEA, Bordeaux), who kindly provided public access to this specimen.

2. Tutorial

Before using this tutorial, I strongly recommend to download and read ISE-MeshTools User's Guide, and especially the "Menu Scalars" section.

2.1 Download and unzip files

Download and unzip the files associated to this tutorial in a folder containing no accent. Open ISE-MeshTools. Also, make sure that the path leading to the folder containing the tutorial files does not contain any accent. Otherwise, ISE-MeshTools will not be able to open the contained files.

2.2 A brief overview of enclosed files

2.2.1 Prerequisite: activate scalar display mode

Scalar values can be associated to each vertex with ISE-MeshTools. Scalar values can be displayed when scalar display mode is active. To activate/deactivate scalar display mode, click on " ". When active, the rainbow colour scale shows up in the bottom-right part of the 3D rendering window.

Displayed scalars and scalar associated colour scales can aslo be onpened by clicking on " " (see ISE-MeshTools User's Guide for further explanations).

2.2.2 SP07 surface and position files

You may load the enclosed .vtk files (File -> Open Surface, then select SP07_EDJ.vtk. Then open the second file File -> Open Surface, then select SP07_OES.vtk).

The present tutorial contains a .ori file, which contains orientation labels for the coordinate system orientation helper. These label are designed for a right upper tooth. You can load the enclosed .ori file (File->Orientation labels, then select "SP07.ori"). Once loaded, the system coordinate orientation helper will show the following labels :

+z axis : apical

-z axis : coronal

+y axis : lingual

-y axis : buccal

+x axis : mesial

-x axis : distal

You may then position the 2 surfaces so that they match the labels defined above.

As a general rule, when opening a new object, I strongly recommend to change its position in order that it matches the 6 predefined camera positions:

When pressing " ", object should be viewed from right side.

When pressing " " object should be viewed from left side.

When pressing " ", object should be viewed from front side.

When pressing " ", object should be viewed from back side.

When pressing " ", object should be viewed from above.

When pressing " ", object should be viewed from below.

Once correctly positioned, you may save the objects' current positions (File->Position->Save Position). Note: the position matrices should be identical for the EDJ and OES surfaces.

The present tutorial contains two .pos file (containing each the same information), which you may load in order to place correctly the OES and EDJ (File -> Open Position, then chose "SP07_EDJ.pos" and "SP07_OES.pos").

You may chose to render the OES surface transparently, in order to see the EDJ surface below the OES surface.

You can unselect all opened objects by pressing "CTRL +D", or select all objects by pressing "CTRL +A". You can delete all selected objects by pressing "Del".

2.2.3   SP07 project file

The present tutorial contains a project .ntw file, which may be useful to directly open the EDJ and OES of SP07 upper right second molar in a convenient position directly. First, delete all currently opened objects (press "CTRL+A", then press "Del"). Then open the enclosed .ntw file (File->Open Project, then select "SP07.ntw").

2.3   Using scalars with ISE-MeshTools

Please now refer to ISE-MeshTools User's Guide to learn about how to compute and render enamel thickness, EDJ curvature and other scalars with ISE-MeshTools.

2.4   Saving scalars

Whenever your save the files in .vtk format, the associated scalars are saved along with the geometry of the objects

3. Acknowledgements